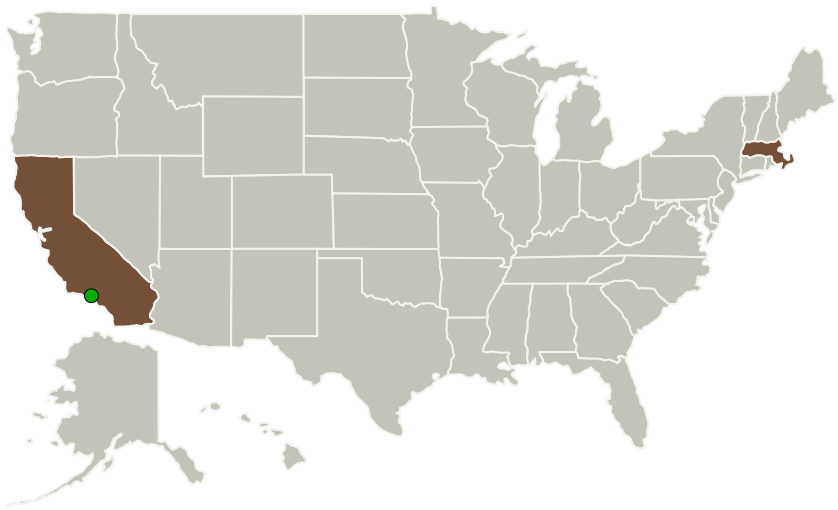
Compact LIDAR for Aerosol Extinction Profiling from Small UAV's, Phase I

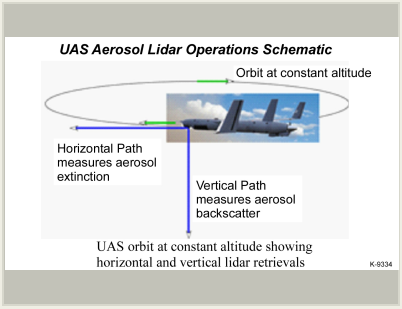
Completed Technology Project (2013 - 2013)

Project Introduction

It is increasingly recognized that the Arctic is a bellwether for climate change. As the Arctic region responds to climate forcings, monitoring how aerosol distributions respond and modify their impact on radiative transfer will become increasingly important in refining climate models and predictions. NASA, along with other agencies, has launched several programs such as ARCTAS to increase observations of the region and incorporate findings into large scale climate models. In order to supplement satellite observations and given the difficulty of ground-based observations in the Arctic, instrumented Unmanned Aircraft Systems (UASs) represent one means to efficiently monitor large areas. Measurement of the vertical profile of atmospheric aerosol optical properties can provide new data crucial to understanding climate change in the Arctic. New instrumentation is required to enable routine, widespread measurements with good precision from unmanned aircraft. These new observations will have important implications for global climate change modeling and, ultimately, international energy policy making. In the Phase I program, we will develop a complete conceptual design for a flight-worthy, compact, eye safe lidar that will enable vertical profiling of aerosol optical extinction and scattering and that will be deployable on a compact unmanned aircraft system like the SIERRA or ScanEagle. In the Phase II program, we will fabricate, test, and field demonstrate a prototype sensor.

Primary U.S. Work Locations and Key Partners





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Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
Physical Sciences, Inc.	Lead Organization	Industry	Andover, Massachusetts
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Massachusetts

Project Transitions

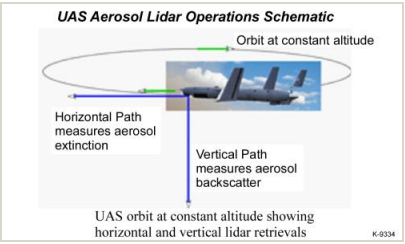
May 2013: Project Start

November 2013: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138047)*

Images



Project Image
Compact LIDAR for Aerosol Extinction Profiling from Small UAV's
(https://techport.nasa.gov/image/127794)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Physical Sciences, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

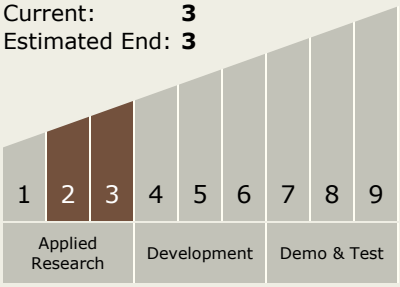
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
David M Sonnenfroh

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System